# 64 - ANALISYS OF PHYSICAL FITNESS OF YOUNG SOCCER PLAYERS

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## INTRODUCTION

Soccer is considered one of the most popular sports in the world and has become increasingly more competitive. Part of this evolution was due to the balance of tactical, technical, psychological and physical aspects of each athlete or group.

Several studies (FUENZALIDA et al., 1987; CAICEDO et al., 1993) were performed trying to establish the profile of soccer players at several ages and levels of competition. Amongst the variables that could determine the success of young athletes are the cardiorespiratory endurance, the agility and the muscular strength.

The aerobic capacity has fundamental importance not only during the match but also in the recovery period of the players. In order to customize the assessment and training prescription, many sports professionals have used invasive and non-invasive methods of physical evaluation as instruments of practical applicability capable of evaluating and quantifying the aerobic capacity of athletes (DENADAI, 1999).

One of the most employed non-invasive tests to evaluate the cardiorespiratory capacity is that proposed by Cooper (1978), which consists of running the longest distance possible in 12 minutes.

Seabra et al. (2001) have demonstrated that the influence of training on agility was more important than the biological maturation among footballers 12 to 16 years old. A study conducted by Garganta et al. (1999) amongst young soccer athletes of different levels (elite and non-elite) in agility tests found significantly better values for those in the elite group, raising the hypothesis that sport specialization would influence the agility performance of soccer players of the higher categories. Agility, as characterized by displacements in various directions, either with or without the ball, but always in speed (LITTLE & WILLIANS, 2005), can be considered as one of the most important variables to soccer practice. According to Comas et al. (1992) when analyzing professional players of the state championship of São Paulo agility was one of the outstanding variables.

The orientation of the sports training must also take into account the importance of strength power a physical quality required in all sports. Strength power is the product of power and velocity and refers to the ability of the neuromuscular system to produce the greatest possible impulse in a certain period of time (WISLOFF et al. 1998). The evaluation of this variable was also done in our study. It can be indirectly assessed with simple measures in different sports (jumping, kicking, throwing and sprint race) (WEINECK, 2003).

In Soccer, volleyball, basketball and handball, the strength of vertical jump is very important for performance; the deficits in this physical quality are necessarily corrected by training. The jump-and-reach test easily evaluates this variable. Just as the strength of vertical jump, that of horizontal jump can also be easily measured by assessing the hopped distance horizontally from a standing position, since this jump does not require much in terms of coordination of the athlete, but rather strength (WEINECK, 2003).

## OBJECTIVE

The objective of the work was to verify the cardiorespiratory endurance, agility and the levels of strength of a group of young footballers who participate of tournaments held by the Federação Mineira de Futebol in the categories Juvenile and Junior.

## METHODOLOGY

The sample consisted of 22 male soccer players with an average age of 16.1 ± 1.01 years (mean ± standard deviation), participants of the championships held by the Federação Mineira de Futebol in the categories Juvenile and Junior. The project was submitted to the Ethical Committee in Human Research of Universidade Federal de Ouro Preto, and after approval of protocols, the tests were performed on a single team in their own headquarters. Tests were conducted in the early pre-season.

In order to assess agility the shuttle run test was employed. To this end, each subject performed two trials, with a five-minute interval between these. The less time to perform this motor task was registered. Two lines were drawn 9,14m away from each other. Two wooden blocks (5 x 5 x 10cm) were placed at 10cm of the extreme line in relation to the assessed subject and separated from each other by a 30cm space, in a symmetrical position with respect to the extreme margin. On the signal “Ready? Go!” the footballers runs to the blocks, picks one up, runs back to the starting line, and places the block behind the line; he then runs back and picks up the second block, which he carries back across the starting line.(HUNSICKER & REIFF, 1976).

In order to evaluate the cardiorespiratory capacity the Cooper test (walking or jogging in 12 minutes) was used, which consists of running the longest distance possible in on this interval (COOPER, 1978).

The vertical jump test consisted of a leap for familiarization with the testing and posterior performing of three vertical jumps. The goal is to touch as loud as possible with the tips of the fingers on a plate previously marked. The average distance reached in the jumps was subtracted from the higher distance reached by the fingertips of the subject measured while standing next to the measuring plate before the jump.

To perform the standing long jump test, a baseline that could not be overcome by the toes of the individual was drawn on the floor. After a jump to adapt to the test, three jumps were made and the distance reached was measured considering the distance from the starting line to the heel of the assessed.

## RESULTS

In the agility test only 29.03% of the players were classified as being in the 50 percentile or above, as can be seen in table 1.

Table 1 – Distribution of the frequency categories of percentiles predetermined by Hunsicker & Reiff (1976) according to age.

| Proposed percentiles by Hunsicker & Reiff (1976) according to age | Frequency |
|---|---|
| 70th | 6.45% |
| 55th | 12.90% |
| 50th | 9.67% |
| 40th | 6.45% |
| 35th | 12.90% |
| 30th | 29.03% |
| 25th | 3.22% |
| 20th | 3.22% |
| 15th | 3.22% |
| 10th | 12.90% |

Adapted from Hunsicker & Reiff (1976). There were no players ranked in percentiles omitted from the table above (100th; 95th; 90th; 85th; 80th; 75th; 65th; 60th; 45th; 5th; 0th).

The average for the group of players in Cooper's test allows us to classify them in the 5th category of aerobic capacity, i.e., "Excellent", however when the individual classification was done, it was observed that in fact 36.36% of players were in this category, while 22.72% were in the top category, i.e., "Superior". Furthermore 31.81% were found to be in the “Good” range and 9.09% in the “Mean” one.

Table 2 – Frequency distribution for the categories of aerobic capacity in a 12-minute test of young footballers.

| Category of aerobic capacity | Distance (m) (men 13 - 19 years) | Frequency distribution |
|---|---|---|
| I - Very Weak | < 2090 | 0% |
| II - Weak | 2090 - 2200 | 0% |
| III - mean | 2210 - 2510 | 9.09% |
| IV - Good | 2520 - 2770 | 31.81% |
| V - Excellent | 2780 - 3000 | 36.36% |
| VI – Superior | > 3000 | 22.72% |

Adapted from Cooper (1978).

The result of the group for the vertical jump test was 46.18 ± 5.05cm while that for the standing long jump test was 204 ± 0.14cm.

**DISCUSSION**

Considering that the cardiorespiratory capacity and agility of football athletes can be used as indicators of success in this sport, assisting in the detection of young talents, the present study investigated these parameters in young footballers who participate of tournaments held by the Federação Mineira de Futebol in the categories Juvenile and Junior, in the early pre-season.

Considering the group average for the Cooper test (2836.99 ± 229.90 meters - classification in the 4th category of aerobic capacity, i.e., "excellent"), the coach and/or physical trainer could spend more time than necessary for improving this capacity of 22.72% of players who are already above this classification. Stratification showed that there is a need to work differently with 77.27% of the players in order to improve cardiorespiratory capacity, being the result of two players worrying because they were in the category "Mean"

The agility test also indicated that a large portion of the subjects need to improve the level of agility to reach an acceptable level or at least compatible with individuals who want to become athletes.

Grützner & Weineck (1988) cited by Weineck (2003) presented results of vertical jump testing for various sports, amongst which the worst results were registered for tennis players (50.6cm) and the best for jumpers in athletics (67.8cm); for footballers the values varied between 57 and 57.5cm.

The result of the group of athletes studied (46.18±5.05) was lower than that found in the literature and no player stood out individually, i.e., none was found within the range previously reported.

Fetz & Kornexl (1978) also cited by Weineck (2003) presented results for youth 4-18 years of both sexes in the long jump test. For boys aged 14-18 the values were: (197,2cm - 14 years); (205,9 cm – 15 years); (229,8 – 16 years) and (234,7 17/18 years). Grützner & Weineck (1988) cited by Weineck (2003) presented results for football players ranging from 248-250cm. Our results are below those described in the literature evaluating the same athletes individually.

Various works, such as those of Silva (2006) and Braz (2006) found that after pre-season, professional athletes and young adults have undergone significant changes in all variables at the end of this period, becoming more resistant, fast and powerful. The athletes evaluated in this study were early in the pre-season, so we suggest that these may change significantly during the championship, and some athletes were added to the team recently.

**CONCLUSION**

The tests performed allow us to conclude that the group of players need to practice the physical qualities tested and that the analysis of individual values allows us to select those who really need more training.

Financial support: CNPq, CAPES, FAPEMIG e UFOP.

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**ANALISYS OF PHYSICAL FITNESS OF YOUNG SOCCER PLAYERS**

**ABSTRACT**

The physical performance of teenage and young adult athletes is influenced by the volume of training, the level of the competitions besides other factors. Thus, this study aimed at verifying the cardiorespiratory endurance, the agility and the strength levels of a group of young footballers who participate of tournaments held by the Federação Mineira de Futebol in the categories Juvenile and Junior. The cardiorespiratory endurance was assessed by the Cooper test (walking or jogging in 12 minutes) while the shuttle run test was used as an indicator of agility. Strength was measured through tests of vertical and horizontal jumping. The average for the group of players in Cooper's test allows us to classify them in the 5th category of aerobic capacity, i.e., "Excellent", however when the individual classification was done, it was observed that in fact 36.36% of players were in this category, while 22.72% were in the top category, i.e., "Superior". Furthermore 31.81% were found to be in the “Good” range and 9.09% in the “Mean” one. In the agility test of the players more than half (70.97%) were below the 50th percentile for age, a worrying result considering the importance of agility to footballers. The group presented unsatisfactory results, as compared to the literature, in both tests of strength, that is, 46.18 ± 5.05cm for vertical jump and 204 ± 0,14cm for standing long jump. The tests performed allow us to conclude that the group of players need to practice the physical qualities tested and that the analysis of individual values allows us to select those who really need more training.

**KEYWORDS**: Young footballers, cardiorespiratory fitness, physical test.

**ANALYSE DE L´APTITUDE PHYSIQUE DES FOOTBALLEURS DES CATÉGORIES JUVÉNILES ET JÚNIOR**

**RÉSUMÉ**

La perfomance physique des athlètes adolescents et jeunes adultes est sous l'influence du volume d´entraînement, du niveau des compétitions, en plus d'autres facteurs. Ainsi, cette étude a eu l'intention de vérifier la résistance cardiorespiratoire, l'agilité et les niveaux de force d'un groupe de jeunes footballeurs qui ont participé aux championnats accomplis par la Fédération Mineira de Football dans les catégories Juvéniles et Júnior. Il a été utilisé le test de marcher ou de courir 12 minutes de jogging pour évaluer la capacité cardiorespiratoire, et, comme marqueur d'agilité, le test Shuttle Run a été employé. La force a été mesurée par les tests d'impulsion verticale et horizontale. La moyenne trouvée pour le groupe des footballeurs dans le test de Jogging a permis de classifier ces footballeurs dans la 5ème catégorie de capacite aérobic, autrement dit, "Excellente", cependant quand il a été fait la classification individuelle, il a été observé qu'en fait 36,36 % des footballeurs étaient dans cette catégorie, tandis que 22,72 % étaient dans une catégorie ci-dessus, autrement dit, "Supérieurs". D'autre part, 31,81 % des footballeurs ont été classifiés dans la 4ème catégorie - "Bon" et 9.09 % dans la 3ème - "Moyen ". Pour le test d'agilité, au-dessus de la moitié des footballeurs (70,97 %) ont présenté des résultats au-dessous du percentile 50 selon l'âge, préoccupant le résultat considérant l'importance de l'agilité pour le footballeur. Le groupe a présenté des résultats insatisfaisants si comparé avec la littérature aussi pour les deux tests de force explosive, autrement dit, 46,18 ± 5,05 centimètres pour l'impulsion verticale et 204 ± 0,14 centimètres pour l'impulsion horizontale. Les tests accomplis permettent de conclure que le groupe de footballeurs ont besoin d´intensifier l´effort des qualités physiques évaluées et que l'analyse des valeurs individuelles permet d'identifier le footballeur qui a vraiment besoin de la plus grande formation physique.

**MOTS-CLÉS:** jeunes footballeurs, capacité cardiorespiratoire, tests physiques.

**ANÁLISIS DE APTITUD FÍSICA DE JUGADORES DE FÚTBOL CATEGORÍAS JUVENIL Y JÚNIOR**

**RESUMEN**

El rendimiento físico de los atletas adolescentes y adultos jóvenes se ve influida por el volumen de entrenamiento, el nivel de las competiciones, y otros factores. Este estudio trata de determinar la resistencia cardiorrespiratoria, la agilidad, y los niveles de fuerza explosiva de un grupo de los jugadores de fútbol jóvenes que participan en los campeonatos en poder de la Federación de Fútbol de Minas Gerais en las categorías de Juvenil y Júnior. Para evaluar la aptitud cardiorrespiratoria se utilizó el test de Cooper (caminar o correr en 12 minutos) y como un indicador de la agilidad, se utilizó el test Shuttle Run. La fuerza explosiva se midió por los testes de impulsión vertical y horizontal. El promedio para el grupo de jugadores en la prueba de Cooper nos permite clasificarlos en la categoría 5 de la capacidad aeróbica, o "Excelente", sin embargo cuando clasificamos individuales, se observó que, de hecho, un 36,36% de los jugadores estaban en esta categoría, mientras que 22,72% estaban por encima de la categoría, o "Superior". Además 31,81% fueron clasificadas en la categoría 4 - "Buena" y 9,09% en la 3 - "Media". En el teste de agilidad, más de la mitad de los jugadores (70,97%) estaban por debajo del percentil 50 para la edad, resultado preocupante teniendo en cuenta la importancia de la agilidad para el futbolista. El grupo tuvo resultados malos en comparación con la literatura también para las dos pruebas de diagnóstico de la fuerza explosiva, es decir, 46,18 ± 5,05cm de salto vertical y 204 ± 0,14cm para la impulsión horizontal. Las pruebas nos permiten concluir que el grupo de jugadores necesita entrenar las cualidades físicas evaluadas y el análisis de los valores individuales le permite seleccionar aquellos que realmente necesitan más entrenamiento.

**PALABRAS CLAVE**: jóvenes futbolistas, capacidad cardiorrespiratoria, pruebas físicas.

**ANÁLISE DA APTIDÃO FÍSICA DE FUTEBOLISTAS DAS CATEGORIAS JUVENIL E JÚNIOR**

**RESUMO**

O desempenho físico de atletas adolescentes e jovens adultos é influenciado pelo volume de treinamento, pelo nível das competições, além de outros fatores. Assim, este estudo pretendeu verificar a resistência cardiorrespiratória, a agilidade e os níveis de força explosiva de um grupo de jovens futebolistas participantes dos campeonatos realizados pela Federação Mineira de Futebol nas categorias Juvenil e Júnior. Para avaliar a capacidade cardiorrespiratória foi utilizado o teste de andar ou correr 12 minutos de Cooper e como indicador de agilidade, empregou-se o teste Shuttle Run. A força explosiva foi medida pelos testes de impulsão vertical e horizontal. A média encontrada para o grupo de jogadores no teste de Cooper permite classifica-lo na 5ª categoria de capacidade aeróbica, ou seja, “Excelente”, entretanto quando foi feita a classificação individual, observou-se que de fato 36,36% dos jogadores estavam nessa categoria, enquanto 22,72% estavam uma categoria acima, ou seja, “Superior”. Por outro lado 31,81% foram classificados na 4ª categoria - “Boa” e 9.09% na 3ª - “Média”. Para o teste de agilidade mais da metade dos jogadores (70,97%) apresentaram resultados abaixo do percentil 50 segundo a idade, resultado preocupante considerando a importância da agilidade para o futebolista. O grupo apresentou resultados insatisfatórios se comparados com a literatura também para os dois testes de força explosiva, ou seja, 46,18 ± 5,05 centímetros para impulsão vertical e 204 ± 0,14 centímetros para impulsão horizontal. Os testes realizados permitem concluir que o grupo de jogadores precisa treinar as qualidades físicas testadas e que a análise dos valores individuais permite selecionar quem realmente precisa de mais treinamento.

**PALAVRAS CHAVE:** Jovens futebolistas, capacidade cardiorrespiratória, testes físicos.